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(21) International Application Number: PCT/SE99/00740 (22) International Filing Date: 4 May 1999 (04.05.99) (30) Priority Data: 9801604-1 8 May 1998 (08.05.98) SE (71) Applicant (for all designated States except US): TELIA AB (publ) [SE/SE]; Mårbackagatan 11, S-123 86 Farsta (SE). (72) Inventors; and (75) Inventors/Applicants (for US only): JOHANSSON, Martin [SE/SE]; Klackvägen 70, S-865 53 Sundsvall (SE). JUS- SILA, Kari [SE/SE]; Piteåvägen 69, S-857 31 Sundsvall (SE). BYSTRÖM, Leif [SE/SE]; Stationsgatan 65B, S-972 34 Luleå (SE). (74) Agent: PRAGSTEN, Rolf; Telia Research AB, Vitsandsgatan 9, S-123 86 Farsta (SE).		(81) Designated States: EE, JP, LT, LV, NO, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>Without international search report and to be republished upon receipt of that report.</i>
(54) Title: ARRANGEMENT TO INTERCONNECT USERS AND SERVICE PROVIDERS		
<div style="text-align: center; border: 1px solid black; padding: 10px; margin: 10px auto; width: 80%;"> <p>Video Conference, WWW, Telephony</p> <p>Film distribution, E-mail etc</p> <hr style="border-top: 1px dashed black;"/> <p>General control level</p> <p>(IP-, E 164-addresses)</p> <hr style="border-top: 1px dashed black;"/> <p>IP, ATM, SDH, PSTN, ISDN,</p> <p>GSM, Ethernet, CATV, ADSL/VDSL etc</p> </div>		
(57) Abstract <p>The invention relates to an arrangement to interconnect users and service providers to, independent of qualities of different carrier services or specific networks and access forms, transmit information between users and service providers. The invention provides an interface with specified qualities to respectively interconnect the user and the service provider with a connectivity network which includes management system and the physical transmission equipment to transmit information between the user and the service provider. Preferably the interfaces are dynamically adaptive and have adaptive management qualities.</p>		

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ARRANGEMENT TO INTERCONNECT USERS AND SERVICE PROVIDERS

FIELD OF THE INVENTION

5 The present invention relates to an arrangement to interconnect user and service providers, and more exactly such an arrangement to, independent of qualities of different carrier services or specific networks and access forms, transmit information between users and service
10 providers. The invention provides on the one hand an interface with specified qualities which can be changed dynamically, and on the other a connectivity network which includes management system and the physical transmission equipment.

15

PRIOR ART

To-day services which are delivered via the telephone network, the Internet, the Cable-TV network etc are tailor-made to the network or the carrier which transmits the
20 service from the service provider. By that the services will be totally dependent on the qualities of a specific network and the system will be locked both from the user's and the service provider's point of view.

The present invention solves this problem by providing
25 a common, general control level between the user and the service provider. According to the invention, connectivity products with different performances which can be adapted dynamically to different requested services are offered. At the same time the connectivity products have uniform
30 standardised interfaces both to the user and the service provider.

SUMMARY OF THE INVENTION

Consequently the present invention provides an
35 arrangement of the above mentioned kind to interconnect users and service providers.

According to the invention, the invention includes interfaces which have specified qualities to respectively interconnect the user and the service provider with a connectivity network which transmits the information
5 between the user and the service provider.

Preferably the interfaces are dynamically adaptive and have adaptive management qualities.

The invention is defined in enclosed patent claim 1, whereas preferred embodiments are given in the subclaims.

10

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described in detail below, with references to enclosed figures in which:

Figure 1 is a diagram over a structure in layers of
15 services and networks according to the invention.

Figure 2 is a block diagram which describes the relation between user, service provider, and telecommunications operator according to the invention.

Figure 3 is a diagram over the construction of a
20 connectivity product according to the invention.

Figure 4 is a general diagram over the arrangement between user and service provider according to the invention, and

Figure 5 is a diagram similar to Figure 4, with
25 details of a connectivity network according to the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

To avoid that an end user service becomes dependent on
30 the qualities of a specific network, or that an end user service becomes dependent on qualities of different carrier services, it is desirable to have a common control level which can be regarded as the "waist" of an hour-glass. In Figure 1 is shown different services in an upper layer, and
35 different networks and access forms in a lower layer with a general control level in between.

This means that a plurality of end user services can make use of a plurality of networks and access forms if all are using a common independent control level containing general connectivity products.

5 It will be even more important that a telecommunications operator in a well-defined way has his/her activity arranged in layers according to the demands which will be in the future regarding roles, responsibility and regulation aspects. End user services
10 and connectivity must be distinguished between and be packeted as products each.

To initiate connectivity in a centralised way over one in layers well-defined interface, and via management systems instead of via signalling towards the network
15 elements, will give several advantages. I.a. it will result in that respective network technology and in its belonging physical resources can be used in a more optimal way. To secure quality of signalling towards network elements are otherwise required a lot of redundancy and over-capacity.
20 End user services and carrier networks may evolve each on their pre-conditions and technical progress without being dependent on each other. In addition more qualities can be offered to the connectivity services if they are initiated via management systems.

25 It is important to realise that connectivity is an affair in itself. In Figure 2 is shown graphically how the connectivity is structured according to the invention. A Connectivity Provider's (CP) only customer are Service Providers (SP). The application users who use the
30 connectivity (consumers) are customers to Service Providers. Notice that the telecommunications operator also can be Service Provider.

There consequently are two alternative ways of initiating connectivity, either via a centralised interface
35 via management system (Connectivity Services in Figure 2), or via signalling directly towards the network elements

(Connectivity and Terminal Connection Services). The latter is predominant today. For both cases applies that the service for which the service shall be used must be pre-ordered at a service provider.

5 A connectivity provider has only one product field to charge the service provider for, namely to transmit multimedia information between endpoints of the connectivity network either point-to-point, point-to-multi-point, or multipoint-to-multipoint. Two basic products
10 exist:

- **Best-effort connectivity:** Only the access point in the network is specified, as to the rest no guarantees are given related to control and handling of resources in the connectivity network. No quality can be guaranteed.
- 15 • **Resource-reserved connectivity:** A certain quality of the connectivity is guaranteed for all types of connectivity which require control and handling of resources in the connectivity network.

 The new concept of this invention is that these two
20 basic products can be packeted in different ways to specific connectivity products by varying bandwidth, traffic parameters and quality parameters (Quality of Service; QoS) and add qualities depending on need, to be tailor-made for a service provider's services. Examples can
25 be connectivity products which support IP-telephony, VLAN-services, TCSL-LAN, video conference, Internet-access, e-mail, film distribution, interactive multimedia games etc. These specific connectivity products are of a dynamic character; they can be created and deleted at short notice
30 depending on the multimedia-services they shall support.

 Examples of bandwidth are:

- **Medium high bandwidth:** Everything from narrow band to the order of several Mbit/s on average for the end user service.
- 35 • **Propagation delay:** The time which is allowed for information to propagate over the network.

- Delay jitter: The allowed variation of delay in the connectivity. Mainly depending on delays in the queues in, for instance, IP-routers or ATM-switches.

- Loss rate: The probability that data will be lost.

5 Examples of traffic parameters are:

- Max.bandwidth: The maximal number of bits which will be delivered to the network.

- Burstiness: Measure of the burstiness of the traffic which the end user service will deliver.

10 The qualities which can be added to the specific connectivity products are:

- **FCAPS-functionality** i.e. Fault, Configuration, Accounting, Performance, Security; consequently general management functionality belonging to a connectivity

15 service.

- **Mobility functionality** i.e. terminal, personal respective session mobility for the connectivity service.

- The possibility to handle a multiple of mutually related instances of connectivity products, initiated by a service provider, as a unit. If one of the connections goes down, all the other instances perhaps also shall be disconnected.

20

 What qualities that can be offered depends to a great extent on how the connectivity has been initiated; management-based, or signalled towards network elements. Generally can be said that more qualities can be offered if the connectivity is initiated management-based.

25

 The basic connectivity products with specifications plus possibly qualities are packeted as products to fit end user services which are offered by service providers, as is shown in Figure 3.

30

 The entry to the connectivity provider's connectivity network will only be through the specific connectivity products. The connectivity products can be accessed either via centralised interface via management system (called ConS-RP in Figure 4 and 5) for service providers, or via

35

signalling directly towards the network elements (called TCon-RP in Figure 4 and 5) for the end users (CPE).

The connectivity provider's connectivity network consists of technology independent management systems, technology specific management systems, and the physical transmission equipment which consists of a heterogeneous collection of switches, transmission equipment and adapters belonging to different network technologies. In the management systems the connectivity products which have been offered over the centralised interface which is called ConS-RP in Figure 5, are implemented. The connectivity products over TCon-RP, on the other hand, are principally implemented in the network elements as today.

The invention can be used in all interactive and distributive end user services which telecommunications operators will produce, if they have arranged their activity in layers for service providers and connectivity providers. The invention is only limited by the following patent claims.

PATENT CLAIMS

1. Arrangement for interconnection of users and service providers, c h a r a c t e r i s e d in interfaces
5 which have specified qualities to respective interconnect a user and a service provider with a connectivity network, to transmit information between the user and the service provider.

2. Arrangement according to patent claim 1,
10 c h a r a c t e r i s e d in that the interfaces are dynamically adaptive.

3. Arrangement according to patent claim 2, c h a r a c t e r i s e d in that the interfaces has an adaptive bandwidth from narrow band to several Mbit/s.

15 4. Arrangement according to patent claim 2, or 3, c h a r a c t e r i s e d in that the interfaces have adaptive quality parameters (QoS) such as propagation delay, delay jitter, loss rate.

5. Arrangement according to patent claim 2, 3, or 4,
20 c h a r a c t e r i s e d in that the interfaces have adaptive traffic parameters such as max. bandwidth and burstiness.

6. Arrangement according to any of patent claims 2-5, c h a r a c t e r i s e d in that the interfaces have
25 adaptive management qualities.

7. Arrangement according to patent claim 6, c h a r a c t e r i s e d in that the interfaces have a general management functionality related to, for instance, fault, configuration, accounting, performance, security
30 (FCAPS).

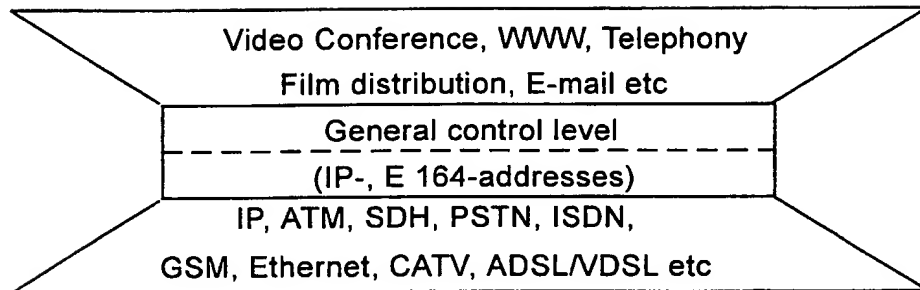
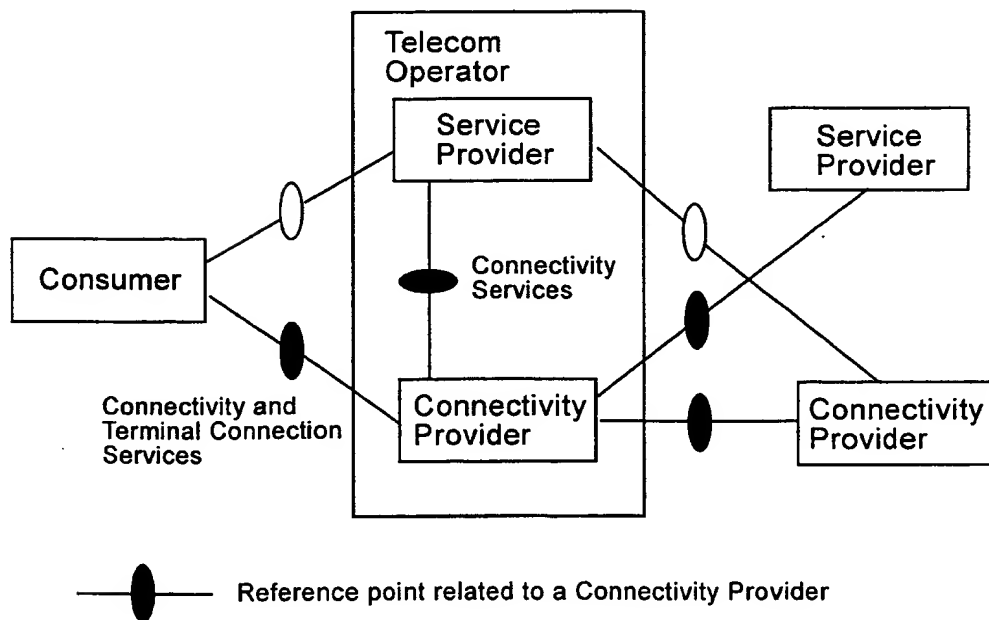
8. Arrangement according to patent claim 6, or 7, c h a r a c t e r i s e d in that the interfaces have a general mobility functionality related to, for instance, terminal, session, and personal mobility.

35 9. Arrangement according to any of the previous patent claims, c h a r a c t e r i s e d in that the connectivity

network includes technology independent management systems, technology specific management systems, and physical transmission equipment related to different network technologies.

- 5 10. Arrangement according to any of the previous patent claims, c h a r a c t e r i s e d in that it supports IP-telephony, VLAN-services, TCS LAN, video conference, Internet-access, e-mail, film distribution, interactive multimedia games.

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**Figure 1****Figure 2**

Construction of a Connectivity Product

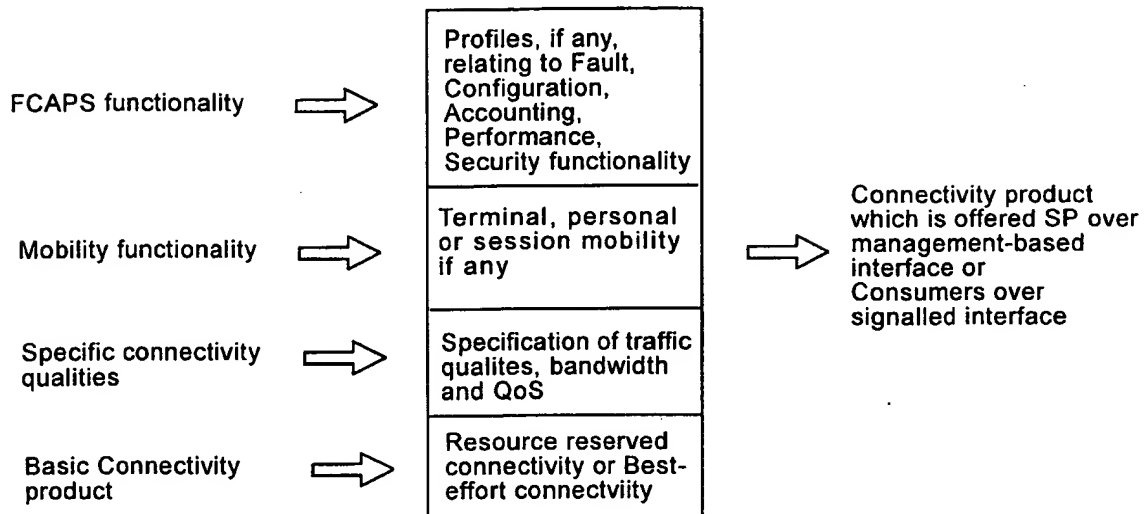


Figure 3

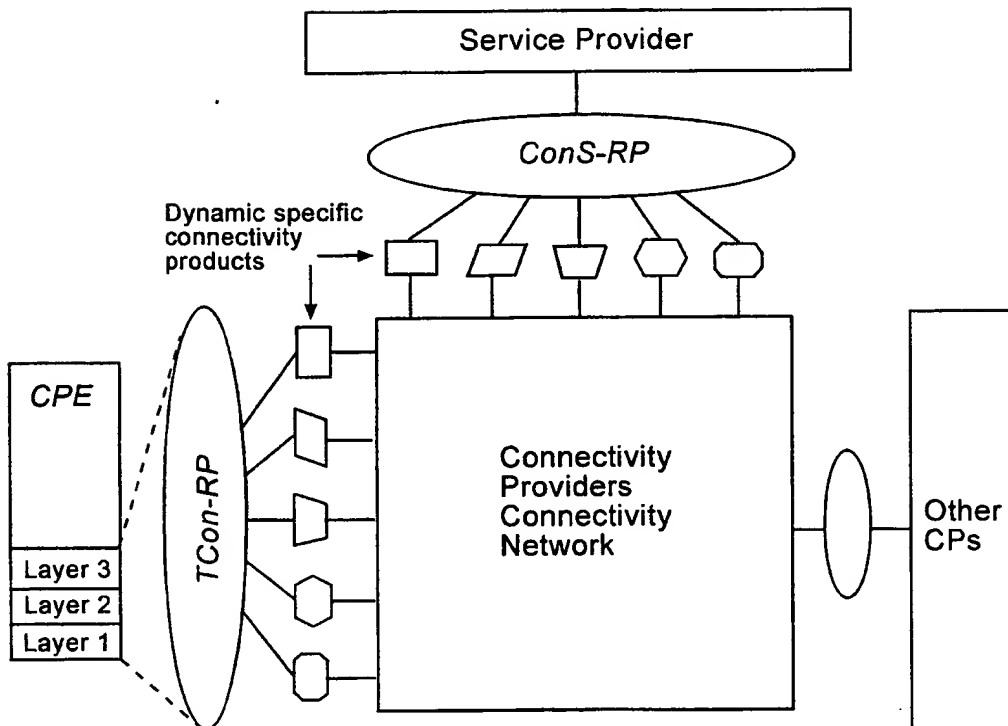


Figure 4

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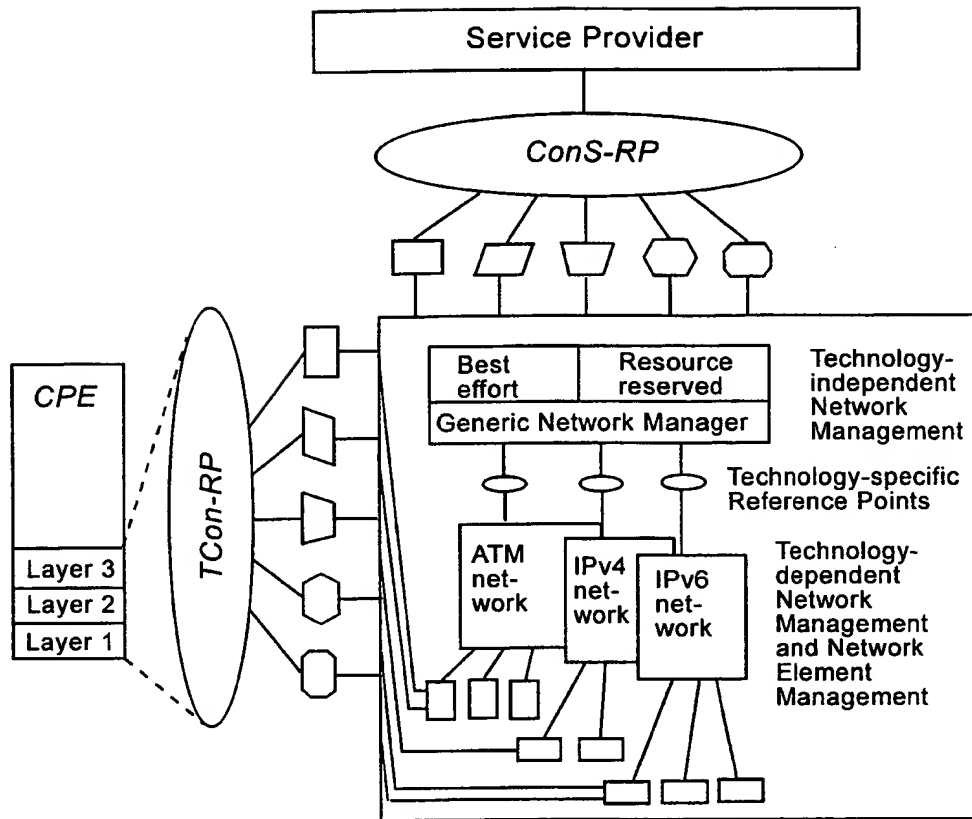


Figure 5

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(54) Title: ARRANGEMENT TO INTERCONNECT USERS AND SERVICE PROVIDERS		
<div style="text-align: center;"> <p>Video Conference, WWW, Telephony</p> <p>Film distribution, E-mail etc</p> <p>General control level (IP-, E 164-addresses)</p> <p>IP, ATM, SDH, PSTN, ISDN, GSM, Ethernet, CATV, ADSL/VDSL etc</p> </div>		
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/00740

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04M 3/42, H04Q 11/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: H04M, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPIL, EDOC, JAPIO

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9612381 A1 (ROBERT BOSCH GMBH), 25 April 1996 (25.04.96), figure 2, abstract, see page 2, last paragraph --	1-10
X	WO 9746073 A2 (TELEFONAKTIEBOLAGET LM ERICSSON), 11 December 1997 (11.12.97), figures 4-9, abstract, see summary of the invention ---	1-10
P,X	WO 9824224 A1 (TELEFONAKTIEBOLAGET LM ERICSSON), 4 June 1998 (04.06.98) -- -----	1-10

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

15 October 1999

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29-10-1999

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INTERNATIONAL SEARCH REPORT
Information on patent family members

28/09/99

International application No.

PCT/SE 99/00740

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9612381 A1	25/04/96	AU 3696695 A DE 4436642 A	06/05/96 18/04/96
WO 9746073 A2	11/12/97	AU 3113697 A AU 3113797 A AU 3198597 A AU 3198697 A CN 1221530 A CN 1221531 A CN 1221533 A CN 1221534 A EP 0898833 A EP 0898837 A EP 0898838 A EP 0903031 A SE 506775 C SE 9602212 A SE 9603932 A WO 9747118 A WO 9747119 A WO 9747127 A AU 5236698 A SE 511236 C SE 9604409 A WO 9824224 A	05/01/98 05/01/98 05/01/98 05/01/98 30/06/99 30/06/99 30/06/99 30/06/99 03/03/99 03/03/99 03/03/99 24/03/99 09/02/98 05/12/97 29/04/98 11/12/97 11/12/97 11/12/97 22/06/98 30/08/99 30/05/98 04/06/98
WO 9824224 A1	04/06/98	AU 3113697 A AU 3113797 A AU 3198697 A AU 5236698 A CN 1221530 A CN 1221533 A CN 1221534 A EP 0898833 A EP 0898837 A EP 0898838 A SE 511236 C SE 9604409 A WO 9746073 A WO 9747119 A WO 9747127 A	05/01/98 05/01/98 05/01/98 22/06/98 30/06/99 30/06/99 30/06/99 03/03/99 03/03/99 03/03/99 30/08/99 30/05/98 11/12/97 11/12/97 11/12/97